

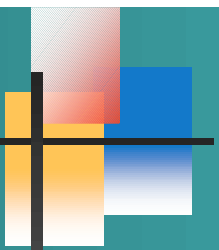
# Information and Communication Technologies

## Building Capacities in African Universities

By

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Director General/CEO



National Information Technology Development  
Agency

Federal Ministry of Science and Technology

At

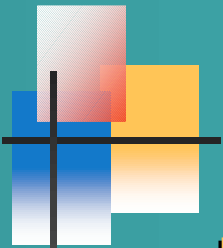
ICTP

Trieste, Italy.

11<sup>th</sup> – 16<sup>th</sup> Feb, 2002

**Convergence**

**Technology, Services, Goods e.t.c**



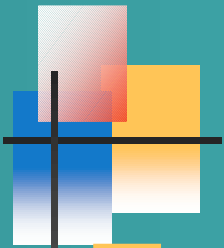
Information

Telecommunications

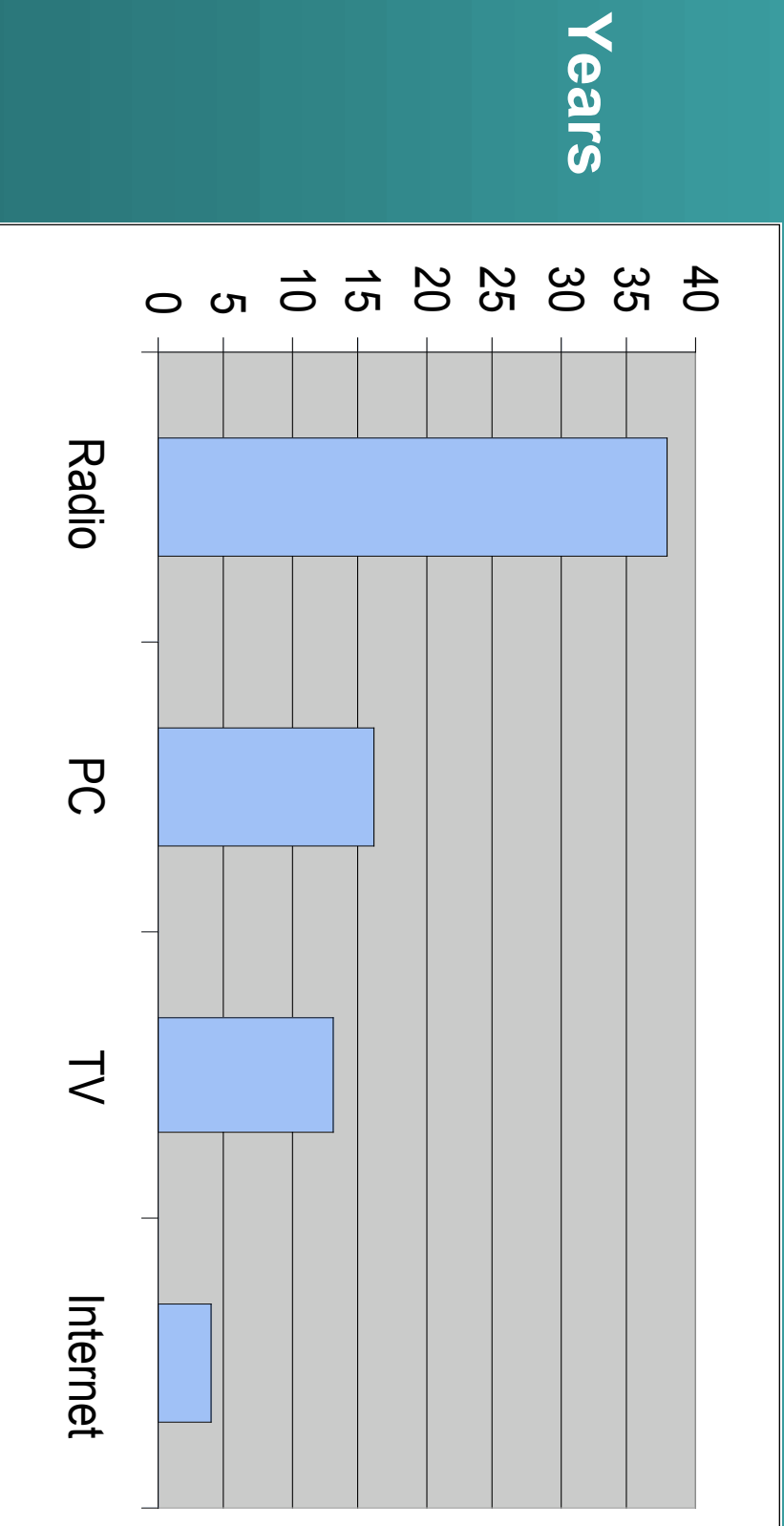
Computers

## **ICT as World's Largest Machine**

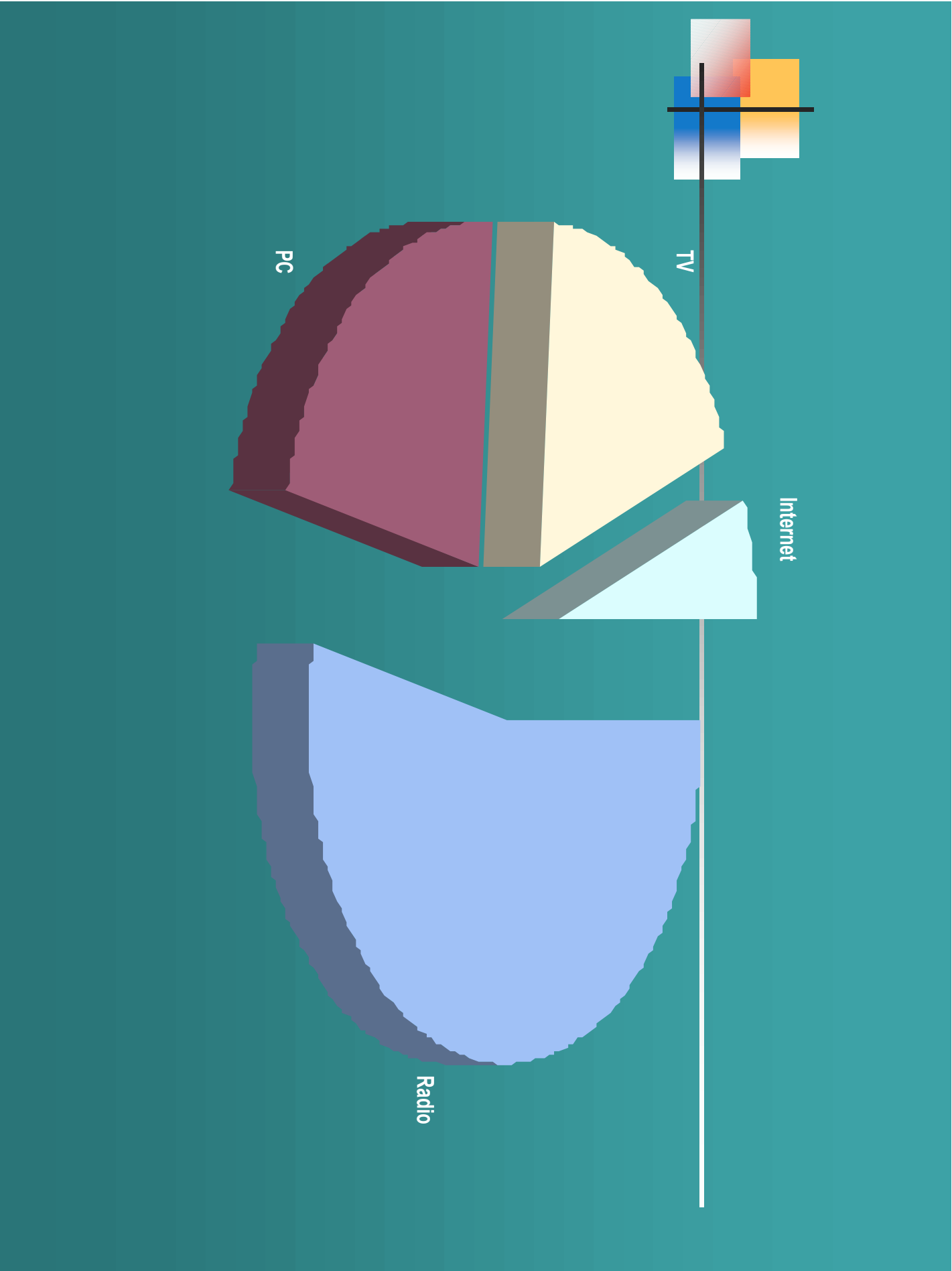
- Internet doubles every hundred days
- Revolutionary in development in terms of *price/performance* ratio
- Mobility – Mobile Internet
- Need for fundamental shift in Educational Methodology

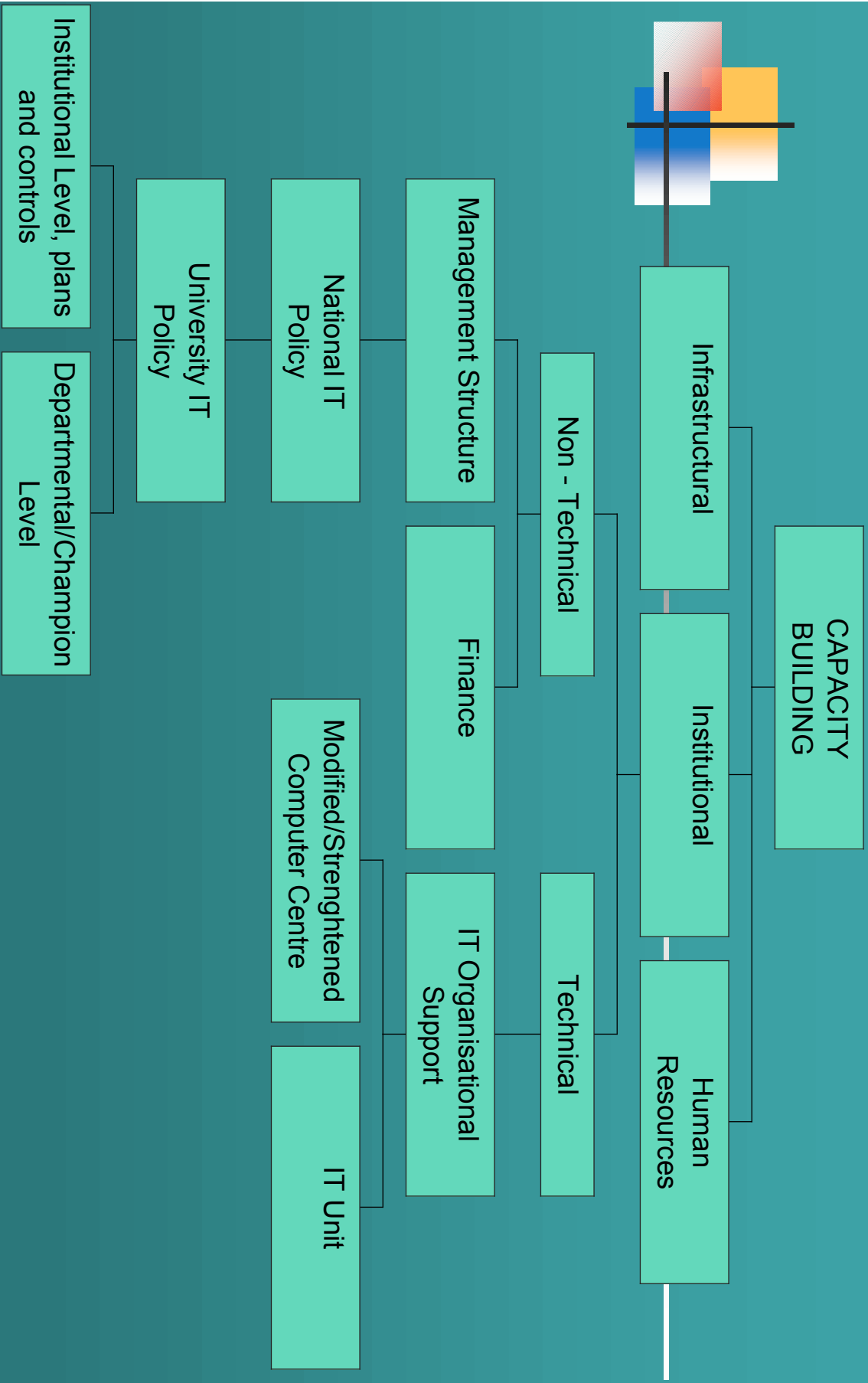
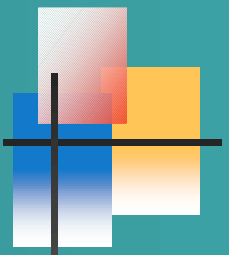


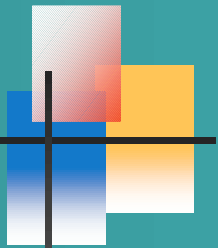
# Reaching the 50 million mark



Years to reach 50 million mark







# Human Resources

## Education

Curricula Restructuring

IT Academic Department

IT Literacy for Students

Faculty Members

Administrative Staff

Critical Mass of IT Experts

Workshops

Integration of IT into Teaching and Research

## Training

Brain Drain

Special Incentives

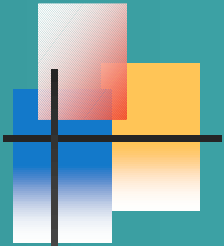
Networking

Hardware

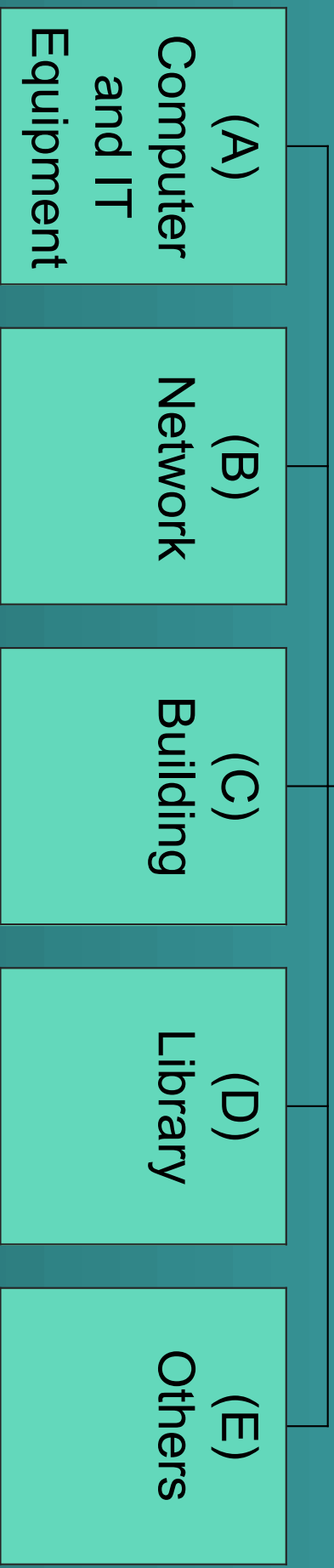
Software

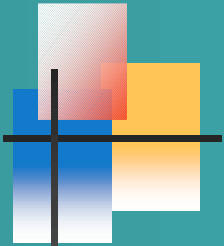
System Administration

Web Technology

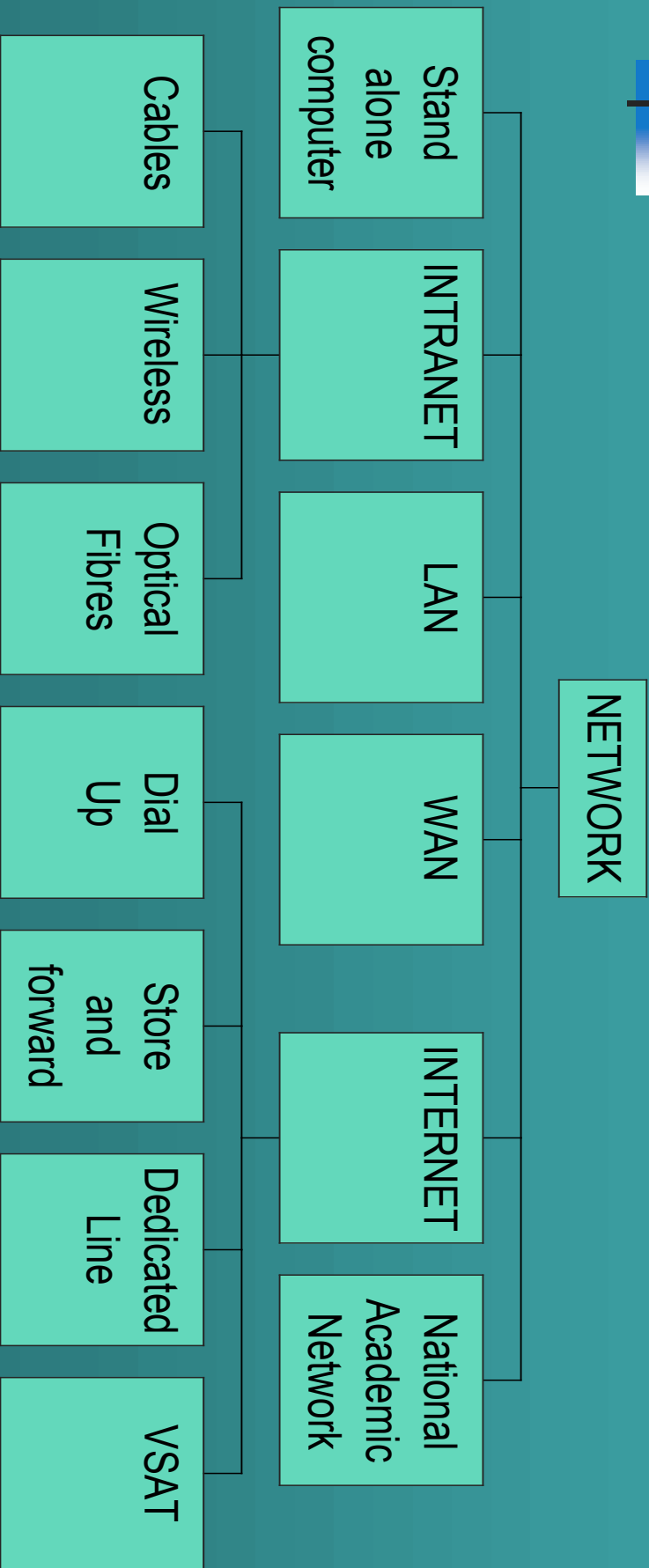


## INFRASTRUCTURAL CAPACITY BUILDING

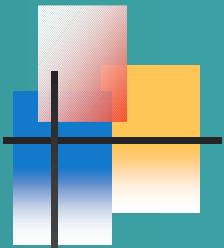




# B







**D**

Library

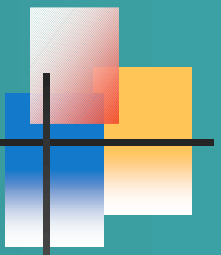
Integrated  
Library  
Management  
System

Library  
Network

Connection  
to  
Campus  
Network

Access  
to  
Internet

Access to  
Virtual/Digital  
Libraries



# E

Other Infrastructures

Telephone facilities

Earthing and Lightning Arrestor

Electricity Supply

Digital PABX

Analogue

Connectivity to PSTN

Reliable Public Supply

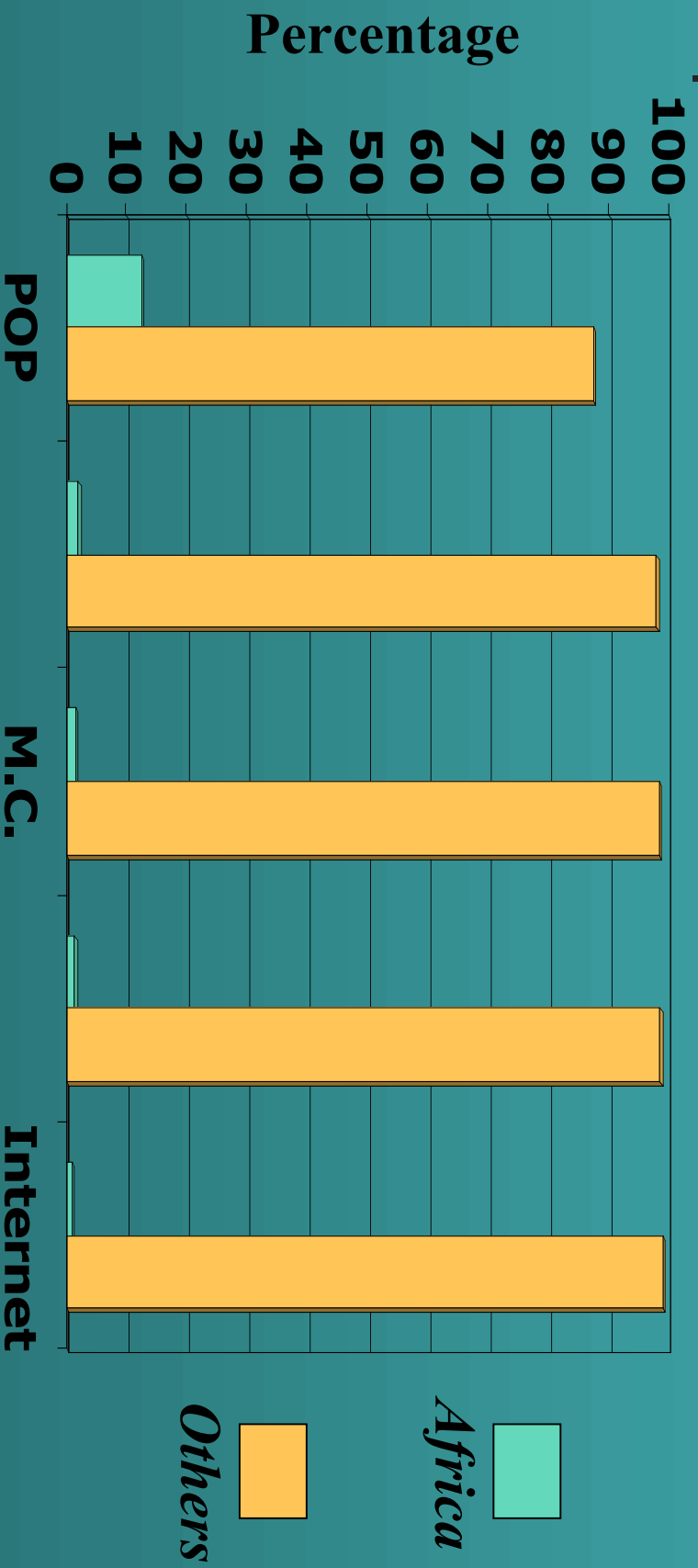
Alternative Sources e.g. Solar

Standby Facilities

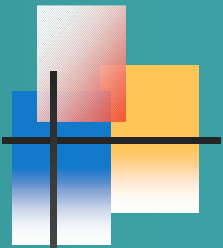
Analogue

Digital

# Comparative Distribution of ICT Facilities



- POP* - Population
- F.L.* - Fixed Line Subscribers
- MC* - Mobile Cellular Subscribers
- PC* - Personal Computers



## **Functions of HEIs (J. Daly) Include:**

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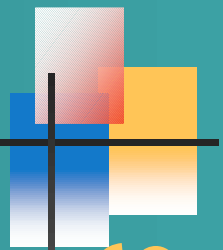
- ▣ *Education (traditional, distance education & others)*
- ▣ *(Research & Development)*
- ▣ *Knowledge Creation, Organization & Management*
- ▣ *Knowledge Gate Keeping*
- ▣ *Archival & Library Services*
- ▣ *Management & University administration*
- ▣ *Socio-economic-technological Services*
- ▣ *Overcoming the Digital Divide*
- ▣ *Human Resources Development in general*
- ▣ *Technological Gate-Keeping*
- ▣ *Technological Transfer & Adaptation*



# *Levels of ICT and Internet Development in HEIs*

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- Single Computer with Dial-Up facilities
- Local Area Network (LAN) in a location for all users
- Local Area Network
- Campus Area Network
- Library LAN
- Internet Connectivity of Campus Network
- VSAT and wireless facilities for quick deployment



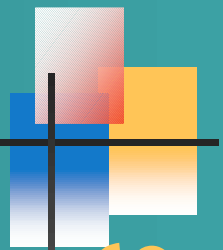
# State and Use of ICT in HEIs

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- Poor availability and quality of infrastructure
- Inadequate Institutional Capacity
- Inadequate Human Resource Capacity
- Low bandwidth of connectivity Poor penetration of ICT into HEI's
- Poor penetration of ICT into HEI's

## Some Obstacles

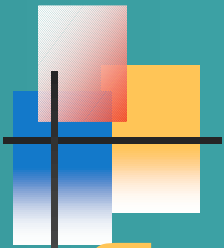
- Absence of NICI policy to take care of HEI's
- Gross under-utilization of existing infrastructures
- Poor telecommunications facilities
- Electricity supply and other basic infrastructures



# Some Internet Services

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- **E-mail:**
  - Academic
  - Administration
  - Management
  - Socio-economic activities
- **Remote Login (Telnet)**
  - Possible access to super computer facilities
- **World Wide Web (WWW)**
  - Revolution within revolution
  - Teaching, research and development
  - Distance Education and on-line courses

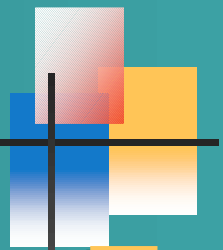


## Uses in ICT in HEIs

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- Teaching, Learning and Research;
- Contents provision;
- Professional tool for future labour market;
- Administration and Operational Management;
- Tactical and Strategic Management;
- Collection, dissemination and exchange of information;
- Support for conduct and management of research;
- Transformation of library to an Information collection, processing, compiling and dissemination unit;
- Minimal usage of IT currently locally in the University and externally;

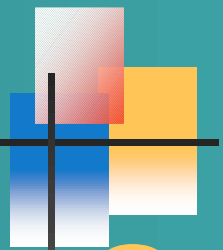




# Library in the Information Age

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- **Transformation into a new information services unit**
  - Electronic acquisition and serials control
  - Electronic inter library loan
  - Electronic circulation functions
- **Gradual trends toward library digitization**
  - Emergence of library information networks
  - Connectivity to campus intranet and Internet
  - Journals on CD-ROMs
  - Electronic Journals
- **Use of digital libraries in Africa and worldwide**



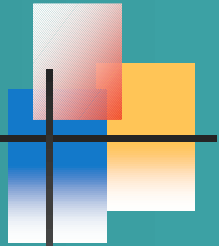
# Comparative Situation

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- Over 200 universities in the US have 45Mbps Internet connectivity
- 85% of primary schools have 1.5Mbps Internet connectivity
- ONLY a few African universities have 64kbps and higher bandwidth

## Integration of IT into University Functions

- Entry (*teachers teach students to use IT*)
- Adoption (*teachers use IT to support traditional instruction*)
- Adaptation (*teachers use IT to enrich curricula*)
- Appropriation (*IT is integrated and used for its unique capabilities*)
- Invention (*Development of new learning environment using IT as a tool*).

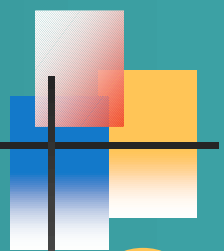


# Policy and Development Strategies and Projects

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## ICT IN HEIs IN 9 COUNTRIES STUDIED REVEAL ABSENCE OF NCI POLICY

- Group 1: Definitive Institutional IT Policy
  - Examples: University of Dar es Salaam, Tanzania  
University of Zambia, Lusaka
- Group 2: Non-Definitive IT Policy at the on-set
- Examples: University of Ghana
  - Obafemi Awolowo University, Ile-Ife, Nigeria
  - National University of Lesotho
  - University of Swaziland



# Global Trends

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- **On-line courses**
- **Tele-education**
- **Tele-medicine**
- **Distance Education**
- **Multi-media**
- **Virtual Learning, Virtual Laboratory and Virtual Observatory**
- **Mobile Information Society**
- **New Generation Internet (NGI) in Gbps**
- **Virtual/Digital Libraries**



## **Some Findings about the on-line Discussion on ICT in HEIs in Africa**

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- ❖ *ICT provides powerful tools and new paradigm for execution of the functions of HEIs – education, knowledge creation, knowledge organization and management, knowledge gate keeping, archival and library services as well as socio-economic-technological services to the community;*
- ❖ *A lot of similarity in the HEIs studied;*
- ❖ *Need to transform HEIs from traditional role to a more demanding*
- ❖ *role catalyzed by the ICT;*
- ❖ *Donor financial & technical assistance , especially in HRD were*
- ❖ *significant to the success of the projects;*



## **Some Findings about the on-line Discussion on ICT in HEIs in Africa - cont'd**

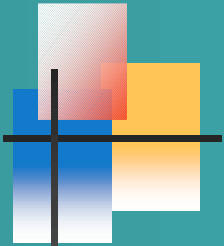
- ❖ *New curricula necessary, which is learner centered;*
- ❖ *Integration of ICT into learning, research and management is still in its infancy in most of the cases*
- ❖ *Internet based degree programmes , and Internet based open Universities could constitute challenges to the traditional brick and mortar traditional universities*
- ❖ *ICT strategic policy, plans and implementation mandatory*
- ❖ *HEIs can be marginalized by global on-line institutions*
- ❖ *Urgent need to integrate ICT into learning, research & management*
- ❖ *Transformation of the library into new Information Services Unit*



# Framework for Assessment of ICT maturity

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- Planning and monitoring tools;
- Application of ICT to Teaching and Learning;
- Application of ICT in Research;
- Application of ICT in Academic Information Services (Library);
- Application of ICT in Administration and Management
- ICT Infrastructure;
- ICT Organizational Support (Infrastructure);
- ICT Financing;
- Training, Research and Development in ICT.



# RECOMMENDATIONS

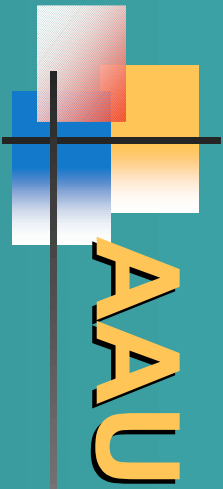




# Role of AAU, HEIs and Other Stakeholders

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- Should make adequate budget provisions for ICT
- Should declare IT as a priority project
- Must create access to computer facilities for staff and students by providing adequate funding
- Must not rely only on donation assistance for ICT development
- Donor assistance could accelerate the development of ICT in HEI
- Should have a website
- Must acquire skills to use and develop IT
- Should embark on institution-private sector R & D projects
- Must be part of IT development
- Adequate infrastructure should be established
- Adequate institutional capacity including policy and action plan
- Adequate HRD must be developed



- An integrated digital (virtual) library for Africa must be set up
- Creation of network for ICT experts
- Assessment exercise should be completed and output posted on the website
- Should develop guidelines to the setting up of ICT facilities in HEIs
- Should create an observatory on the Internet – One stop shop on ICT in HEIs
  - *Development of ICT in HEIs*
  - *Benchmarks*
  - *Success Stories*
  - *Policy related matters*
- Should extend DATAD project to more HEIs
- Should collaborate the evolution of a comprehensive African Digital Library



# Role of International Funding Agencies

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- Support to AAU in the realization of the roles and goals of AAU
- Creation of ICT observatory on the Internet
- Establishment of tool box and help desk
- Setting up of Internet connectivity with bandwidth of not less than 64 kbps in HEIs
- Establishment of a comprehensive and information rich African digital/virtual library in collaboration with other stakeholders in the project
- Selection of universities at various levels of ICT development for ICT pilot projects to be funded by the funding agencies and locally
- Development of national and regional academic information network



# Conclusion

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- Absolute Necessity For HEIs to be Vanguard for ICT Use and Development In Africa
- Need For Infrastructural, Institutional and Human Capacity Development
- ICT Capacity Building To Achieve
  - Sustainability of the technology
  - Poverty alleviation
  - Job Creation and Wealth Creation for the graduates
  - Food Production and Security
- African HEIs without adequate ICT facilities in the next one year or two max. will not be able to discharge the functions for which they were established and will be serving little or no role in the advancement of knowledge.
- The continued existence of such HEIs becomes debatable